



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,854	03/24/2005	Peter William McOwan	**03-0005	2806
23377 7590 06/11/2009 WOODCOCK WASHBURN LLP CIRA CENTRE, 12TH FLOOR 2929 ARCH STREET PHILADELPHIA, PA 19104-2891				
EXAMINER PARK, EDWARD				
ART UNIT 2624		PAPER NUMBER		
MAIL DATE 06/11/2009		DELIVERY MODE PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/500,854

Applicant(s)

MCOWAN ET AL.

Examiner

EDWARD PARK

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-55 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This action is responsive to applicant's amendment and remarks received on 3/24/09. Claims 1-55 are currently pending.

Response to Arguments

2. Applicant's arguments filed on 3/24/09, in regards to claim 1, have been fully considered but they are not persuasive. Applicant argues that the cited prior art references do not teach the newly added limitation, normalizing means for normalizing an arc length of the signature trace to 1 (see pg. 15, fifth paragraph). This argument is not considered persuasive since the Geiger reference teaches the cited limitation within paragraphs [0020], [0054], [0080], where respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering. Examiner notes that the newly added limitation has 112 issues that can be seen below along with the rejection of claim 1.

Regarding claims 17, 33, 38, 43, 48, 55, applicant argues that the claims are allowable due to the same reasons as stated within claim 1 (see pg. 16, second paragraph). This argument is not considered persuasive since claim 1 stands rejected and the arguments and rejections are recited within this correspondence.

Regarding claims 2-16, 18-32, 33-37, 39-42, 44-47, 49-54, applicant argues that the claims are allowable due to the dependency from the corresponding independent claims (see pg. 16, last paragraph). This argument is not considered persuasive since all independent claims stand rejection and the arguments and rejections are recited within this correspondence.

Claim Rejections - 35 USC § 112

3. In response to applicant's amendment of claims 1, 17, 38, 55, the previous claim rejection is withdrawn. However, newly amended limitations necessitate new 112 issues as stated below.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 1, 17, 33, 38, 43, 48, 55** rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim calls for the element, "normalizing an arc length of the signature trace to 1". The element, "normalizing an arc length of the signature trace to 1", is unclear and deems the claim indefinite. The scope of protection is unclear since what is an arc length based off of a signature trace that is normalized to 1? Is the arc length to be transformed to a constant 1? Does 1 have a unit? Is the normalization to 1 in order to produce a single

continuous trace? The examiner will interpret the newly added amendment as reasonably broad as possible. Therefore, the examiner will interpret the cited limitation added by the applicant as equivalent to normalizing an arc length of the signature trace and will give no weight to the latter portion of the cited limitation, due to the ambiguity of the claim. Correction is required.

Claim Rejections - 35 USC § 101

6. In response to applicant's argument and remarks in regards to claims 17-32, 33-37, 48-54, 55, the previous claim rejections are withdrawn.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 1-7, 15-23, 31-48, 51, 55** are rejected under 35 U.S.C. 103(a) as being unpatentable over by Plamondon (US 5,101,437) with Geiger et al (US 2006/0050962 A1), and further in view of Hu et al (US 6,157,731).

Regarding **claim 1**, Plamondon teaches an authentication system for authenticating a user's signature as electronically inputted into a system by a manual input device providing an

output indicative of its location with respect to time when manipulated by the user, the system comprising:

a first extraction means for extracting angle and distance data relating to different parts of the user's signature inputted into the system by the manual input device to obtain a signature trace (Plamondon: col. 12, lines 1-9; col. 1, lines 44-67);

registration means for setting up a reference data file comprising from angle and distance data extracted from a plurality of samples of the user's signature inputted into the system by the user by means of the manual input device during a registration phase (Plamondon: col. 6, lines 63-68);

comparison means for comparing the angle and distance data extracted by the second extraction means from the user's signature inputted into the system during an authentication phase to reference angle and distance data held in the reference data file, according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15); and

verification means for providing an output indicative of an appropriate match between the inputted signature to be authenticated and the reference data in dependence on the result of the comparison (Plamondon: figures 1a, 1b). Plamondon does not disclose normalization means for normalizing an arc length of the signature trace to 1; and a second extract means for extracting angle and distance data relating to different parts of the normalized signature trace.

Geiger, in the same field of endeavor, teaches normalization means for normalizing an arc length of the signature trace to 1 (see paragraphs [0020], [0054], [0080]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian

Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization means for the signature trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

Hu, in the same field of endeavor, teaches a second extraction means for extracting angle and distance data relating to different parts of the normalize signature trace (see col. 4, lines 53-67; col. 5, lines 1-12; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Geiger combination to utilize the normalization means for the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/comparing through biometric authentication.

Regarding **claim 2**, Plamondon discloses to extract data relating to a plurality of different points of the user's signature including data relating some of said points to other points in the user's signature as inputted into the system by the manual input device (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 3**, Plamondon discloses to extract data relating to a plurality of different points of the user's signature including data relating each of a number of said points to an immediately preceding point in the user's signature as inputted into the system by the manual input device (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 4**, Plamondon discloses to extract data relating to a plurality of different points of the user's signature including data relating a last point to a first point in the user's signature as inputted into the system by the manual input device (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 5**, Plamondon discloses an angle extract means for extracting angle data concerning the relative angular positions of a plurality of points of the user's signature (Plamondon: col. 7, line 49 – col. 8, line 55).

Regarding **claim 6**, Plamondon discloses a distance extract means for extracting distance data concerning the relative distances apart of a plurality of points of the user's signature (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 7**, Plamondon discloses timing extract means for extracting timing data indicative of the relative times between execution of different parts of the user's signature, and the comparison means is adapted to compare the extracted timing data with reference timing data in the reference data file (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 15**, Plamondon discloses a training means for training the system to refine the verification criteria by which a match is to be judged on the basis of angle and distance data relating to a plurality of samples of the user's signature inputted into the system by the user during the registration phase and generated false samples (Plamondon: col. 20, line 59 – col. 21,

lines 67; to determine the personalized threshold values more than one reference signatures are acquired, and compared among themselves taken two by two, to obtain several groups of RC1, RC2 ... to this effect the apparatus further comprises means for comparing each of said Rc1 Rc2 ... with other corresponding value of its own group, and determining maximum value of each group which constitutes respectively personalized threshold values Sp1, Sp2 ...).

Regarding **claim 16**, Plamondon discloses a reject output indicative of non-matching of one or more verification criteria only after completion of all the verification procedures (Plamondon: figure 21; col. 21, lines 28-67).

Regarding **claim 17**, Plamondon discloses a method for authenticating a user's signature as electronically inputted into a system by a manual input device providing an output indicative of its location with respect to time when manipulated by the user, comprising:
extracting angle and distance data relating to different parts of the user's signature inputted into the system by the manual input device to obtain a signature trace (Plamondon: col. 12, lines 1-9; col. 1, lines 44-67);
creating a reference data file comprising angle and distance data extracted from a plurality of samples of the user's signature inputted into the system by the user using a manual input device during a registration phase (Plamondon: col. 6, lines 63-68);
comparing the angle and distance data extracted from the user's signature inputted into the system during an authentication phase to reference angle and distance data held in the reference data file, according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15); and

providing an output indicative of an appropriate match between the inputted signature to be authenticated and the reference data in dependence on the result of the comparison (Plamondon: figures 1a,1b).

Plamondon does not disclose normalizing an arc length of the signature trace to 1; and extracting angle and distance data relating to different parts of the normalized signature trace.

Geiger, in the same field of endeavor, teaches disclose normalizing an arc length of the signature trace to 1 (see paragraphs [0020], [0054], [0080]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization means for the signature trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

Hu, in the same field of endeavor, teaches extracting angle and distance data relating to different parts of the normalized signature trace (see col. 4, lines 53-67; col. 5, lines 1-12; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Geiger combination to normalization the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/comparing through biometric authentication.

Regarding **claim 18**, Plamondon discloses extracting data relating to a plurality of different points of the user's signature including data relating some of said points to other points in the user's signature as inputted into the system by the manual input device (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 19**, Plamondon discloses extracting data relating to a plurality of different points of the user's signature including data relating each of a number of said points to an immediately preceding point in the user's signature as inputted into the system by the manual input device (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 20**, Plamondon discloses extracting data relating to a plurality of different points of the user's signature including data relating a last point to a first point in the user's signature as inputted into the system by the manual input device (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 21**, Plamondon teaches extracting angle data concerning the relative angular positions of a plurality of points of the user's signature (Plamondon: col. 7, line 49 – col. 8, line 55).

Regarding **claim 22**, Plamondon teaches extracting distance data concerning the relative distances apart of a plurality of points of the user's signature (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 23**, Plamondon teaches extracting timing data indicative of the relative times between execution of different parts of the user's signature, and the comparison means is adapted to compare the extracted timing data with reference timing data in the reference data file (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 31**, Plamondon discloses training to refine the verification criteria by which a match is to be judged on the basis of angle and distance data relating to a plurality of samples of the user's signature inputted into the system by the user during the registration phase and generated false samples (Plamondon: col. 20, line 59 – col. 21, lines 67; to determine the personalize threshold values more than one reference signatures are acquired, and compared among themselves taken two by two, to obtain several groups of RC1, RC2 ... to this effect the apparatus further comprises means for comparing each of said Rc1 Rc2 ... with other corresponding value of its own group, and determining maximum value of each group which constitutes respectively personalized threshold values Sp1, Sp2 ...).

Regarding **claim 32**, Plamondon discloses a reject output indicative of non-matching of one or more verification criteria only after completion of all the verification procedures (Plamondon: figure 21; col. 21, lines 28-67).

Regarding **claims 33-37**, Plamondon discloses a method for authenticating a user's signature as electronically inputted into a system by a manual input device providing an output indicative of its location with respect to time when manipulated by the user, comprising:

extracting angle and distance data relating to different parts of a user's signature inputted device to obtain a signature trace (Plamondon: col. 12, lines 1-9; col. 1, lines 44-67); setting up a reference data file comprising angle and distance data relating to a plurality of samples of the user's signature inputted during a registration phase, wherein the plurality of samples of the user's signature are based upon a time to obtain a plurality of samples (Plamondon: col. 6, lines 63-68); comparing the angle and distance data extracted from the user's signature inputted during an authentication phase to reference angle and distance data held in the reference data file, according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15); providing an output indicative of an appropriate match between the inputted signature to be authenticated and the reference data in dependence on the result of the comparison, thereby providing verification of the user's signature (Plamondon: figures 1a,1b); and training to refine the verification criteria by which a match is to be judged on the basis of angle and distance data relating to a plurality of samples of the user's signature during the registration phase and generated false samples (Plamondon: col. 20, line 59 – col. 21, lines 67; to determine the personalize threshold values more than one reference signatures are acquired, and compared among themselves taken two by two, to obtain several groups of RC1, RC2 ... to this effect the apparatus further comprises means for comparing each of said Rc1 Rc2 ... with other corresponding value of its own group, and determining maximum value of each group which constitutes respectively personalized threshold values Sp1, Sp2 ...).

Plamondon does not disclose normalizing an arc length of the signature to 1; and extracting angle and distance data relating to different parts of the normalized signature trace.

Geiger, in the same field of endeavor, teaches normalizing an arc length of the signature to 1 (see paragraphs [0020], [0054], [0080]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization for the signature trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

Hu, in the same field of endeavor, teaches extracting angle and distance data relating to different parts of the normalized signature trace (see col. 4, lines 53-67; col. 5, lines 1-12; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Geiger to utilize the normalization means for the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/comparing through biometric authentication.

Regarding **claims 38-42**, Plamondon discloses a computer-readable storage medium having computer-readable instructions stored thereon for authenticating a user's signature (see fig. 1, numeral 10, col. 10, lines 51-58; unit 10 allows the storage of the software as well as the different data associated with the system), the computer-readable instructions comprising instructions for:

extracting angle and distance data relating to different parts of a user's signature inputted to obtain a signature trace (Plamondon: col. 12, lines 1-9; col. 1, lines 44-67);
setting up a reference data file comprising angle and distance data extracted from a plurality of samples of the user's signature inputted using a manual input device during a registration phase, wherein the plurality of samples of the user's signature are based upon a time to obtain a plurality of samples (Plamondon: col. 6, lines 63-68);
comparing the angle and distance data extracted from the user's signature inputted into the system during an authentication phase to reference angle and distance data held in the reference data file, according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15);
providing an output indicative of an appropriate match between the inputted signature to be authenticated and the reference data in dependence on the result of the comparison, thereby providing verification of the user's signature (Plamondon: figures 1a, 1b);
training to refine the verification criteria by which a match is to be judged on the basis of angle and distance data relating to a plurality of samples of the user's signature during the registration phase and generated false (Plamondon: col. 20, line 59 – col. 21, lines 67; to determine the personalize threshold values more than one reference signatures are acquired, and compared

among themselves taken two by two, to obtain several groups of RC1, RC2 ... to this effect the apparatus further comprises means for comparing each of said Rc1 Rc2 ... with other corresponding value of its own group, and determining maximum value of each group which constitutes respectively personalized threshold values Sp1, Sp2 ...).

Plamondon does not disclose normalizing an arc length of the signature trace to 1; and extracting angle and distance data relating to different parts of the normalized signature trace.

Geiger, in the same field of endeavor, teaches normalizing an arc length of the signature trace to 1 (see paragraphs [0020], [0054], [0080]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization means for the signature trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

Hu, in the same field of endeavor, teaches extracting angle and distance data relating to different parts of the normalized signature trace (see col. 4, lines 53-67; col. 5, lines 1-12; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Geiger combination to utilize the normalization means for the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/comparing through biometric authentication.

Regarding **claims 43-47**, Plamondon discloses a system for authenticating a user's signature, the system comprising:

- an input apparatus, wherein the input apparatus is configured to provide an output indicative of the location of the input apparatus with respect to time when the input apparatus is manipulated (see fig. 1, numeral 2, col. 7, lines 30-44, col. 10, lines 19-27; analogue-to-digital table 2 samples according to a constant frequency the handwriting movement of a user);
- a computing apparatus (see fig. 1, numeral 4), wherein the computing apparatus is configured to: extract angle and distance data relating to different parts of a user's signature outputted by the input apparatus to obtain a signature trace (Plamondon: col. 12, lines 1-9; col. 1, lines 44-67);
- a reference data file comprising angle and distance data relating to a plurality of samples of the user's signature inputted using a manual input device during a registration phase, wherein the plurality of samples of the user's signature are based upon a time to obtain a plurality of samples (Plamondon: col. 6, lines 63-68);
- a comparator apparatus configured to compare the angle and distance data extracted from the user's signature inputted into the system during an authentication phase to reference angle and distance data held in the reference data file, according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15);

an output apparatus configured to provide an output indicative of an appropriate match between the inputted signature to be authenticated and the reference data in dependence on the result of the comparison, thereby providing verification of the user's signature (Plamondon: figures 1a, 1b); and

a trainer configured to refine the verification criteria by which a match is to be judged on the basis of angle and distance data relating to a plurality of samples of the user's signature during the registration phase and generated false samples (Plamondon: col. 20, line 59 – col. 21, lines 67; to determine the personalized threshold values more than one reference signatures are acquired, and compared among themselves taken two by two, to obtain several groups of Rc1, Rc2 ... to this effect the apparatus further comprises means for comparing each of said Rc1 Rc2 ... with other corresponding value of its own group, and determining maximum value of each group which constitutes respectively personalized threshold values Sp1, Sp2 ...).

Plamondon does not disclose normalize an arc length of the signature trace to 1; and extract angle and distance data relating to different parts of the normalized signature trace.

Geiger, in the same field of endeavor, teaches normalize an arc length of the signature trace to 1 (see paragraphs [0020], [0054], [0080]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed

coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization means for the signature trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

Hu, in the same field of endeavor, teaches extract angle and distance data relating to different parts of the normalized signature trace (see col. 4, lines 53-67; col. 5, lines 1-12; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Hu combination to utilize the normalization means for the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/comparing through biometric authentication.

Regarding **claims 48, 51**, Plamondon discloses a method of verifying a user's signature, comprising:
comparing angle and distance data from an input signature during an authentication phase to reference angle and distance data, according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15), and wherein the reference angle and distance data is obtained from a reference data file comprising angle and distance data relating to a plurality of samples of the user's signature; and providing an output indicative of an appropriate match between the inputted angle and distance data and the reference angle and distance in dependence on the result

of the comparison, thereby providing verification of the user's signature (Plamondon: figures 1a, 1b); training to refine the verification criteria by which a match is to be judged on the basis of angle and distance data relating to a plurality of samples of the user's signature during the registration phase and generated false samples (Plamondon: col. 20, line 59 – col. 21, lines 67; to determine the personalized threshold values more than one reference signatures are acquired, and compared among themselves taken two by two, to obtain several groups of RC1, RC2 ... to this effect the apparatus further comprises means for comparing each of said Rc1 Rc2 ... with other corresponding value of its own group, and determining maximum value of each group which constitutes respectively personalized threshold values Sp1, Sp2 ...).

Plamondon does not disclose an arc length of the signature trace is normalized to 1; plurality of samples of the user's signature are based upon a time to obtain a plurality of samples; and the angle and distance data comprises extracted angle and distance data relating to different parts of a normalized signature trace.

Geiger, in the same field of endeavor, teaches an arc length of the signature trace is normalized to 1 (see paragraphs [0020], [0054], [0080]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering); plurality

of samples of the user's signature are based upon a time to obtain a plurality of samples (see paragraph [0062]; normalize the irregularity in a data point density that may be caused by the relative speed of the user handwriting, in the handwriting recognition systems, when the handwriting speed is slower in a particular interval, it would likely contain more points in such interval; it follows that when the writing speed is faster, the interval would likely possess sparser distribution of the point; a conventional technique for executing such filtering procedure is called "equidistant re-sampling" procedure, which forces a minimum Euclidean distance between two data points).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization means for the signature trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

Hu, in the same field of endeavor, teaches the angle and distance data comprises extracted angle and distance data relating to different parts of a normalized signature trace (see col. 3, lines 1-9, col. 4, lines 53-67; col. 5, lines 1-12; processing the raw signature data, thereby to produce smoothed and normalize signature data; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Geiger combination to utilize the normalization means for the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/compared through biometric authentication.

Regarding **claim 55**, Plamondon discloses a method of verifying a signature comprising: receiving, from a manual input device, the signature (see fig. 1, col. 7, lines 30-44; digitizing and segmenting a handwritten movement, an analogue-to-digital tablet 2); extracting angle and distance data relating to different parts of the signature to obtain a signature trace (Plamondon: col. 12, lines 1-9; col. 1, lines 44-67); setting up a reference data file comprising angle and distance data extracted from a plurality of samples of the user's signature inputted into the system by the user during a registration phase (Plamondon: col. 6, lines 63-68); comparing the angle and distance data extracted from the user's signature inputted into the system during an authentication phase to reference angle and distance data held in the reference data file, according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15); and providing an output to the user indicative of an appropriate match between the inputted signature to be authenticated and the reference data in dependence on the result of the comparison (Plamondon: figures 1a,1b).

Plamondon does not disclose normalizing an arc length of the signature trace to 1; extracting angle and distance data relating to different parts of the normalized signature trace.

Geiger, in the same field of endeavor, teaches normalizing an arc length of the signature trace to 1 (see paragraphs [0020], [0054], [0080]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the

handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization means for the signature trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

Hu, in the same field of endeavor, teaches extracting angle and distance data relating to different parts of the normalized signature trace (see col. 4, lines 53-67; col. 5, lines 1-12; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Geiger combination to utilize the normalization means for the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/comparing through biometric authentication.

9. **Claims 8-11, 24-27, 52-54** are rejected under 35 U.S.C. 103(a) as being unpatentable over by Plamondon (US 5,101,437), Geiger et al (US 2006/0050962 A1) with Hu et al (US 6,157,731), and further in view of Young et al (US 4,805,222).

Regarding **claims 8-11**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 1. Plamondon, Geiger with Hu combination does not teach a

password verification means that is provided for verifying input of a required password, as determined by reference password means, by the user using a keyboard input device; timing verification means that is provided for verifying input of the password by the user with the required timing, as determined by reference timing means, using the keyboard input device; and verifying a plurality of hold times for which the relevant keys of the keyboard input device are depressed during input of the password, and means for verifying a plurality of latency times between a release of one key and a depression of a following key during use of the keyboard input device to enter the password.

Young teaches a password verification means that is provided for verifying input of a required password, as determined by reference password means, by the user using a keyboard input device (Young: col. 2, lines 40-52); timing verification means that is provided for verifying input of the password by the user with the required timing, as determined by reference timing means, using the keyboard input device (Young: col. 6, lines 50-63); verifying a plurality of hold times for which the relevant keys of the keyboard input device are depressed during input of the password, and means for verifying a plurality of latency times between a release of one key and a depression of a following key during use of the keyboard input device to enter the password (Young : col. 7, lines 6-21); and user name input means is provided for receiving a user name inputted into the system to identify the identity of the user for the purposes of selection of the required reference data file for that user (Young: figure 10).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize timing password verification and username as suggested by Young, to increase the dynamics and

functionality of the authentication system since an individual's typing pattern tends to be as unique as another biometric feature which allow hierarchies of security to be defined (see col. 1, lines 34-67).

Regarding **claims 24-27**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 17. Plamondon, Geiger with Hu combination does not disclose verifying an input of a required password, as determined by reference password, by the user using a keyboard input device; verifying the input of the password by the user with a required timing, as determined by a reference timing, using the keyboard input device; verifying a plurality of hold times for which the relevant keys of the keyboard input device are depressed during input of the password; and verifying a plurality of latency times between the release of one key and the depression of the following key during use of the keyboard input device to enter the password; and receiving a user name inputted into the system to identify the identity of the user for the purposes of selection of the required reference data file for that user.

Young, in the same field of endeavor, teaches verifying an input of a required password, as determined by reference password, by the user using a keyboard input device (Young: col. 2, lines 40-52); verifying the input of the password by the user with a required timing, as determined by a reference timing, using the keyboard input device (Young: col. 6, lines 50-63); verifying a plurality of hold times for which the relevant keys of the keyboard input device are depressed during input of the password; and verifying a plurality of latency times between the release of one key and the depression of the following key during use of the keyboard input device to enter the password (Young : col. 7, lines 6-21); and receiving a user name inputted into

the system to identify the identity of the user for the purposes of selection of the required reference data file for that user (Young: figure 10).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize timing password verification and username as suggested by Young, to increase the dynamics and functionality of the authentication system since an individual's typing pattern tends to be as unique as another biometric feature which allow hierarchies of security to be defined (see col. 1, lines 34-67).

Regarding **claims 52-54**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 48. Plamondon, Geiger with Hu combination does not disclose verifying an input of a required password, as determined by reference password, by the user using a keyboard input device; verifying the input of the password by the user with a required timing, as determined by a reference timing, using the keyboard input device; verifying a plurality of hold times for which the relevant keys of the keyboard input device are depressed during input of the password; and verifying a plurality of latency times between the release of one key and the depression of the following key during use of the keyboard input device to enter the password.

Young, in the same field of endeavor, teaches verifying an input of a required password, as determined by reference password, by the user using a keyboard input device (Young: col. 2, lines 40-52); verifying the input of the password by the user with a required timing, as determined by a reference timing, using the keyboard input device (Young: col. 6, lines 50-63); verifying a plurality of hold times for which the relevant keys of the keyboard input device are

depressed during input of the password; and verifying a plurality of latency times between the release of one key and the depression of the following key during use of the keyboard input device to enter the password (Young : col. 7, lines 6-21).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize timing password verification and username as suggested by Young, to increase the dynamics and functionality of the authentication system since an individual's typing pattern tends to be as unique as another biometric feature which allow hierarchies of security to be defined (see col. 1, lines 34-67).

10. **Claims 12, 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over by Plamondon (US 5,101,437), Geiger et al (US 2006/0050962 A1) with Hu et al (US 6,157,731), and further in view of Moussa et al (US 5,680,470).

Regarding **claim 12**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 1. Plamondon, Geiger with Hu combination does not teach at least one neural network for determining the verification criteria by which a match is to be judged.

Moussa teaches at least one neural network for determining the verification criteria by which a match is to be judged (Moussa: col. 1, lines 43-59).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize a neural network as suggested by Moussa, to increase the reliability and allow the "[adjustment of] sensitivity" (Moussa: col. 1, lines 43-59) of the verification system.

Regarding **claim 28**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 17. Plamondon, Geiger with Hu combination does not teach at least one neural network for determining the verification criteria by which a match is to be judged.

Moussa teaches at least one neural network for determining the verification criteria by which a match is to be judged (Moussa: col. 1, lines 43-59).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize a neural network as suggested by Moussa, to increase the reliability and allow the “[adjustment of] sensitivity” (Moussa: col. 1, lines 43-59) of the verification system.

11. **Claims 13, 14, 29, 30, 49, 50** are rejected under 35 U.S.C. 103(a) as being unpatentable over by Plamondon (US 5,101,437), Geiger et al (US 2006/0050962 A1) with Hu et al (US 6,157,731), and further in view of Collot et al (US 5,042,073).

Regarding **claims 13 and 14**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 1. Plamondon, Geiger with Hu combination does not teach different features of the user's signature selected according to the fitness of such features to discriminate the user's signature for the purposes of verification and determined by a fitness function relating the relative fitness of the features to their form and number; and an optimization algorithm.

Collot teaches different features of the user's signature selected according to the fitness of such features to discriminate the user's signature for the purposes of verification and determined by a fitness function relating the relative fitness of the features to their form and number (Collot:

col. 1, lines 67-68 – col. 2, lines 1-11); and a optimization algorithm (Collot: col. 1, lines 67-68 – col. 2, lines 1-11).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize a fitness/optimization function as suggested by Collot, to increase the reliability of the system by “minimiz[ing] decision errors” (Collot: col. 2, lines 5-11).

Regarding **claims 29, 30**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 17. Plamondon, Geiger with Hu combination does not teach different features of the user's signature selected according to the fitness of such features to discriminate the user's signature for the purposes of verification and determined by a fitness function relating the relative fitness of the features to their form and number; and an optimization algorithm.

Collot teaches different features of the user's signature selected according to the fitness of such features to discriminate the user's signature for the purposes of verification and determined by a fitness function relating the relative fitness of the features to their form and number (Collot: col. 1, lines 67-68 – col. 2, lines 1-11); and a optimization algorithm (Collot: col. 1, lines 67-68 – col. 2, lines 1-11).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize a fitness/optimization function as suggested by Collot, to increase the reliability of the system by “minimiz[ing] decision errors” (Collot: col. 2, lines 5-11).

Regarding **claims 49, 50**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 48. Plamondon, Geiger with Hu combination does not teach different features of the user's signature selected according to the fitness of such features to discriminate the user's signature for the purposes of verification and determined by a fitness function relating the relative fitness of the features to their form and number; and an optimization algorithm.

Collot teaches different features of the user's signature selected according to the fitness of such features to discriminate the user's signature for the purposes of verification and determined by a fitness function relating the relative fitness of the features to their form and number (Collot: col. 1, lines 67-68 – col. 2, lines 1-11); and a optimization algorithm (Collot: col. 1, lines 67-68 – col. 2, lines 1-11).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize a fitness/optimization function as suggested by Collot, to increase the reliability of the system by “minimiz[ing] decision errors” (Collot: col. 2, lines 5-11).

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDWARD PARK whose telephone number is (571)270-1576. The examiner can normally be reached on M-F 10:30 - 20:00, (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on (571) 272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Edward Park
Examiner
Art Unit 2624

Application/Control Number: 10/500,854
Art Unit: 2624

Page 31

/Edward Park/
Examiner, Art Unit 2624

/Brian Q Le/
Primary Examiner, Art Unit 2624